REMARKS/ARGUMENTS

Status of the Application

In the April 24, 2008, Final Office Action, claims 21-24 and 27 were rejected. In the present response, the claims were amended to clarify that a SWNT is bound to more than one single stranded nucleic acid molecule (see page 5, lines 10-13, for support). Applicants believe that no new matter was added through these amendments.

Thus, claims 21-24 and 27 are pending.

Rejections Under 35 U.S.C. § 103

Claims 21-24 and 27 were rejected under 35 U.S.C. § 103(a) as being obvious over Buzaneva *et al.* (Mater. Sci. Eng. C 19:41-45 (2002)) in view of Yerushalmirozen *et al.* (WO 02/076888). Applicants respectfully traverse these rejections.

Applicants have shown over the course of prosecution that their claims relate to a dispersion of carbon nanotubes and nucleic acids and that Buzaneva *et al.* does not disclose a dispersion. In the previous response to office action, Applicants attempted to demonstrate what dispersion means in the context of the present application by providing a definition for the term, but the Examiner rejected this demonstration in the present office action as just one of many possible definitions. Indeed, the Examiner cites several definitions of "disperse" that are not relevant to the present application. What is unmentioned is that the Examiner's own Dictionary.com citation provides the following physical chemistry definition for disperse: "to cause (particles) to separate uniformly throughout a solid, liquid, or gas." This definition, though not worded the same way, is equivalent to the definition supplied by Applicants in the previous response to office action, and is what the skilled artisan understands the term to mean when read in the context of the present application, without the need to reference a dictionary to define the term.

Applicants realize that there are multiple definitions for "disperse", but the skilled artisan in this field understands what the term means without further clarification, as it is a term of art. This understanding is evidenced by several papers that have already been cited by Applicants to the USPTO, including Duesberg *et al.* (Appl. Phys. A 67:117-19 (1998)), Dalton *et al.* (J. Phys. Chem. B 104:10012-16

(2000)), Bandyopadhyaya *et al.* (Nano Lett. 2:25-28 (2002)), O'Connell *et al.* (Science 297:593-96 (2002)), Williams *et al.* (AIP Conf. Proc. 663:444-48 (2002)), and O'Connell *et al.* (Chem. Phys. Lett. 342:265-71 (2001)) (all cited in the February 24, 2004, IDS), which each contain at least one usage of the term "dispersion" in the context of carbon nanotubes in solution without any definition of what the term means. Thus, the term is known to the skilled artisan, and its use in the present claims should be readily understood by the skilled artisan.

Thus, the skilled artisan understands that there is a distinction between dispersing nanotubes as ropes (bundles of nanotubes) and dispersing them individually. What Applicants claim is the latter (as explicitly stated in the phrase "a dispersed, carbon nanotube - nucleic acid complex **consisting of** a single walled carbon nanotube bound to single stranded nucleic acid molecules . . ."). This distinction is of paramount importance, as when the nanotubes are individually dispersed, it is possible to separate them according to their electronic properties, as Applicants have shown using chromatographic separation techniques. When ropes are solubilized (dispersed), it is not possible to do such a separation. The well-resolved absorbance spectrum of the nucleic acid dispersed nanotubes, what Applicants have repeated attempt to demonstrate during prosecution, can only be obtained when the nanotubes are individually (singly) dispersed and not when dispersed as ropes.

Turning to Yerushalmironzen *et al.*, what Yerushalmironzen *et al.* discloses does not imply that a nucleic acid can be a dispersant for CNTs. That reference teaches SWNTs dispersions by charged, hydrophilic polymers, e.g. polypeptides. However, there are many known examples of charged, hydrophilic polymers that do not disperse CNTs. Examples include poly(acrylic acid), poly(methacrylic acid), and other polymers related thereto. Because of the shear number of possible charged, hydrophilic polymers and the fact that Yerushalmironzen *et al.* does not list nucleic acids among the possibilities leads to the conclusion that it would not even have been obvious to try nucleic acids as dispersants for carbon nanotubes. Indeed, the combination of Buzaneva *et al.* and Yerushalmironzen *et al.* teaches away from the present application because Yerushalmironzen *et al.* is using charged, hydrophilic polymers that disperse carbon nanotubes, and Buzaneva *et al.* shows that a charged, hydrophilic polymer, a nucleic acid, does not disperse carbon nanotubes.

Thus, Applicants do not believe that the skilled artisan, in possession of Yerushalmironzen *et al.*, would turn to Buzaneva *et al.* as a solution to the problem of dispersing carbon nanotubes.

As evidence thereof, Applicants submit herewith a 132 declaration signed by Dr. Ming Zheng, which describes the importance of Applicants' claimed inventions as recognized by others in the field. As noted by Dr. Zheng, the subject matter of the present claims is disclosed in a Nature Materials article published after the priority date of the present application. Nature Materials is one of the preeminent journals in the field of materials science, and therefore the inclusion of Dr. Zheng's research therein is a strong indication that the editors of this journal (scientists that should not be considered mere "ordinarily skilled artisans" but rather experts in the field) did not find a dispersed carbon nanotube - nucleic acid complex consisting of a single walled carbon nanotube bound to a single stranded nucleic acid molecule by non-covalent means to be obvious in light of the knowledge in the art.

Further demonstrating the importance of the present invention is the number of times that the Nature Materials article has been cited by Dr. Zheng's contemporaries in the last two years. Only one article in the entire materials science field has been cited more than Dr. Zheng's article. Additionally, a research laboratory from the National Institute of Standards and Technology called Dr. Zheng's work pioneering, hardly a term used to describe an obvious invention. Finally, further development of Dr. Zheng's work led to a $1.25 million collaboration with Lehigh University and MIT and recognition by Forbes magazine as one of the most important developments in nanotechnology for the year 2003.

In sum, Applicants respectfully submit that the weight of the evidence, both as to the lack of disclosure of the claimed inventions in the prior art and the objective indicia of nonobvious, shows that the present claims should be nonobvious over Buzaneva *et al.* in view of Yerushalmirozen *et al.* Removal of the obviousness rejections is thus respectfully requested.

Summary

In view of the foregoing amendments and remarks, Applicants submit that this application is in condition for allowance. In order to expedite disposition of this case, the Examiner is invited to contact Applicants' representative at the telephone number

below to resolve any remaining issues. Should there be a fee due which is not accounted for, please charge such fee to Deposit Account No. 04-1928 (E.I. du Pont de Nemours and Company).

Respectfully submitted,

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